It is sufficient to state that it is unsatisfactory to our author, who holds that dew on the leaves of plants is (we presume he means occasionally and not universally) derived from the plant itself rather than from condensation from the atmosphere. Dew on growing vegetables is produced by the condensation of the transpired moisture from the plant on its own leaves. This explanation is proved by direct experiment, and we are not disposed to deny its truth. It is probable, and, in fact, more than probable, that plants which are giving off large quantities of water into a cold or overcharged atmosphere should have a portion of their own moisture thrown back upon them. This fact is asserted in Marshall Ward's translation of Sachs's "Physiology of Plants," when he says, "Much of the water we find early in the morning on the margins of the leaves of many field and garden plants in the form of large drops, and which are generally taken for drops of dew, is really water excreted from the plants themselves." That the air is really the cooling medium by which the moisture rising from the warm soil or the growing plant is condensed is no doubt often true. The mist which stretches over the meadows at sundown is moisture condensed in the cool air, and thus becomes precipitated upon vegetation, and not only on vegetation, but upon everything else. Where we think Dr. Stockbridge has overstated his case is when he writes in italics, "*The declaration is here made that dew is the condensed exhalation of the plant.*" The statement is too general, and the assertion has too much of the character of a supposed new discovery on the part of the author. The real facts of the case are, that dew is produced in some cases from condensed exhalations from the plant, or from condensed moisture rising from the soil; but also from the precipitation of moisture from higher sections of the air during the night; especially when the sky is clear. The collection of water in the form of hoar frost upon leafless trees or lawns must be derived from the condensation of atmospheric moisture upon the tree, or upon the grass, cooled by radiation; and we have no doubt that grass radiates heat on a moonlight night more rapidly than does bare ground. Dr. Stockbridge lays too much stress on the fact that the earth is warmer than the air when dew is falling. This he asks us to believe is fatal to the theory that the earth condenses or can condense atmospheric moisture. The radiating power of the earth is very great, and exceeds that of the air, which, in fact, absorbs and retains much heat which otherwise would be immediately lost in space. Dr. Stockbridge argues that the surface of the earth is invariably warmer than the air at the dew point, but this is not likely to be the case. Even the temperature of grass land is affirmed to be always warmer than the air, and hence it is contended that in no instance can the earth or vegetation be the condenser. We are disposed to think that observation will throw more light on this point than such experiments as are quoted or were made by Dr. Stockbridge.

It is probable that dew may be precipitated at times by a colder air on a warmer surface, and at other times by a cold soil or cold expanse of leaf from a warm atmosphere. Whether the leaf of a grass or the air above it acts the part of "the cold pitcher" is not always to be predicated. but in either case dew would be the result. We may point out that, while Dr. Stockbridge is disposed to assert that the soil is always warmer than the air, other authorities are of opinion that the surface, especially of grass, is colder by many degrees than the air. A thermometer laid upon grass would, we believe, recede further and record a lower minimum than one suspended 2 feet above the grass. The freezing of dew on grass during summer nights, which is always an unpleasant sight to gardeners and farmers, appears to be accounted for by radiation of heat from the grass surface, while the substance of the grass cuts off radiated heat from below. The absence of dew under shade also is apparently due to radiation from the earth being checked, and the cooling process of the surface of the earth or its vegetable covering being prevented.

Dr. Stockbridge's book suffers from careless reading of the proofs. This work, the author tells us, he was compelled to depute to others. In one place (p. 183) the word "soil" is evidently used instead of air, thereby reversing the author's obvious meaning, and the word "not" is interpolated, which further confuses the sentence hopelessly. Names of authors quoted are mis-spelt in several cases. The book, especially in the earlier pages, is somewhat bombastic and provincial in its style, and, as we have before stated, many of the earlier pages might have been omitted with advantage. The tone of the writing becomes more modest, precise, and student-like as the author approaches the topics which we are informed upon the title-page he professes.

JOHN WRIGHTSON.

OUR BOOK SHELF.

The Kingdom of Georgia. By Oliver Wardrop. (London: Sampson Low, 1888.)

THE author of this work sees no reason why Georgia should not become as popular a resort as Norway or Switzerland. Perhaps he takes rather too sanguine a view of the energy even of the British tourist, but everyone who reads his book will certainly wish to have a chance of visiting the country he describes. A brighter or pleasanter book of the kind we have not seen for many a day. The style is fresh and sparkling, and Mr. Wardrop has the secret of awakening and maintaining the interest of his readers without any attempt at picturesque fine-writing. He conveys a remarkably vivid impression of the splendid natural scenery of Transcaucasia; but it is in describing the Georgian people that he displays most effectively his powers as an observer. He has the warmest appreciation of the intelligence, bravery, and generosity of the Georgians, and, in the course of his narrative, the extent to which these and other qualities affect their social life is shown with much force and animation. There are valuable chapters on the history, the political condition, and the language and literature of Georgia; and an excellent bibliography of works relating to the country is given as an appendix. The book is also supplied with good maps and illustrations.

The British Journal Photographic Almanac for 1889 Edited by J. Traill Taylor. (London: Henry Greenwood and Co., 1889.)

THIS work, as a compendium of photographic art science, could scarcely be more complete. It contains about 300 closely-printed pages, consisting of articles written by men who are eminent in connection with photography in its various and ever-increasing branches. Great ad-

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vance has been made in this year's volume, both as regards size and the number of articles included; the pages of the calendar which were formerly devoted to the dates of meetings of Societies have here been left blank for the sake of persons desiring to make notes or memoranda.

Valuable hints on all topics are given both to amateurs and professionals, no single department of the work, as far as we can find, having been neglected.

A brief summary of the year's work is given by the editor, touching upon the gradual merging of the brown and purple tones into those of darker and more engraving-like type, the advancement made in flash-light photography, and the new method of platinum-printing. The summary concludes with an obituary of those who have passed away since the last issue.

Next follow series of articles, commencing with one on "Iron Printing," by the editor, and continuing with those contributed by Abney, Burton, Perry, Piazzi-Smyth, and many others.

Twenty pages are devoted to an epitome of progress during the year 1888, and then are added a list of useful receipts, standard formulæ, reference tables, &c.

The Photographer's Diary and Desk-book for 1889. Compiled by the Editor of the *Camera*. (London: Published at the Office of the *Camera*, 1889.)

OF the various diaries brought out for the present year, that issued by the proprietors of the *Camera* will be sure to give great satisfaction to photographers, both amateur and professional. This differs from other photographic diaries in two respects: in the first place, it is much larger, there being plenty of room for notes on experiences of various kinds, results of manipulating, developing difficulties, and many other details well worth recording, which are often so useful and valuable for reference. In the second place, there is a great amount of useful information condensed in the first fifty pages. Besides various tables and processes of developing, printing, &c., information similar to that included in almanacs and other diaries is inserted; the tables and standard formulæ relating to photography being printed in larger type, to enable the worker, when in the dark room, to refer to them. This diary is a very complete and useful publication, and, as a book of reference, is most handy.

LETTERS TO THE EDITOR.

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of* NATURE. *No notice is taken of anonymous communications.*]

The Climate of Siberia in the Mammoth Age.

A SHORT time ago I was discussing with my friend Mr. Henry Seebohm the various problems connected with the distribution and migration of birds in Siberia, about which he has collected so many facts. One fact which he mentioned to me seemed to have a much wider interest than a merely ornithological one, and to illustrate from an unexpected quarter a conclusion which you have allowed me to urge in your columns, and which forms a notable postulate in my recent work on "The Mammoth and the Flood." I mean in reference to the climate of Siberia during the Mammoth age. The views I have advanced on this subject are not my own. I have merely followed in the footsteps of almost every recent Continental authority, especially the authorities with the greatest claims to attention—namely, the Russian naturalists who have visited Northern Siberia. They maintain—and I think the position is unassailable—that during the Mammoth period that district which is now a bare *tundra*, on which neither in summer nor winter could herds of pachyderms find food or shelter, was marked by a temperate climate, and was probably occupied by forests to the very borders of the Arctic Ocean.

This view, which is supported by so many facts, was finally established when it was shown by Schmidt and others that rooted trunks of trees are found in the beds containing Mammoth remains far north of the present range of trees, and that southern forms of fresh-water mollusks, such as the *Cyrena fluminalis*, are also found preserved in the same beds in Siberia far to the north of any place where they will now live. These facts are consistent only with the former existence of a temperate climate in Siberia.

It is interesting to meet with support for this position from the present avifauna of the Palæarctic region. Mr. Seebohm, who has an unrivalled collection of skins, illustrating the ornithology of this region from Britain to Japan, assures me (and, in fact, he showed me the evidence) that certain birds—notably the jay, the nuthatch, the marsh-tit, coal-tit, and long-tailed tit, the great and little spotted woodpecker of England and Japan, and in one case of Northern China—are virtually undistinguishable. Similarly, the hazel grouse of Japan resembles that of the Pyrenees, and the nutcracker of Japan and China is like that of Western Europe. While this is so, the forms of these same birds found in the intervening district of Siberia differ very materially, and have, I believe, in almost every case, been treated as specifically distinct. This is assuredly a very interesting fact. Both Britain and Northern Japan are in the same zoological province—namely, the Palæarctic region, over which there is a singular constancy of types and forms, and yet we find that in certain birds the forms at either extremity of the province are closely allied, while the intermediate form differs. This is at one with the fact that the climate of the two extremities is very similar, and that of the intervening district is very much more severe in the winter. We can hardly doubt that the general adherence to a normal type which marks the fauna and flora of the Palæarctic region (and which was even more marked, and amounted, so far as we know, to identity, in the Mammoth period) is due to the fact that formerly, and in every probability in the Mammoth period, an equality of conditions prevailed throughout. This equality has been maintained at the extremities of the region, with the result of maintaining the old forms and types unaltered; while it has changed and grown more severe in the intervening region, with the corresponding result of altering the types there. The conservatism of forms at either end of the province proves unmistakably a conservatism of conditions. This is assuredly a very interesting independent proof, if proof be now needed, that the climate of Siberia was once much more temperate throughout, and like that of Britain and Japan, and this doubtless in the Mammoth age.

I may add that it seems to me very nearly certain that this change of climate in Siberia was the cause of the conversion of what were once sedentary birds there into birds that migrate to South Africa and elsewhere—a migration which has been very well illustrated by Mr. Seebohm. That the date of the commencement of this migratory tendency is not very remote in time is shown by the fact that the birds have not been more differentiated, notwithstanding the very various conditions prevailing in their several winter-quarters. I believe myself that in the Mammoth period, when the climate of Siberia was temperate, there was no need for these tremendous migrations, which were, no doubt, originally induced by the necessity for finding food in winter; but that most, if not all, of these migratory birds were then either stationary in Siberia, or were only local migrants, like so many of our own birds are now.

Mr. Seebohm, in his recent work on the Charadriidæ, has invoked the Glacial epoch to account for the facts presented by that singularly distributed genus. I know of no Glacial epoch in Siberia before the present. The last epoch there, as we can test and prove by the presence of the undecayed carcasses in the frozen ground, was the period when the Mammoth lived. It was when that period closed (and as I claim to have proved closed very rapidly) that the present Arctic conditions of the Siberian climate were introduced, and I would urge it was from this date that the *present* laws controlling the migration of Siberian birds arose.

This seems an inference of some importance; and when the ornithological history of the eastern half of the Palæarctic region is written in detail, it will very probably be shown that the

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